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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/690,569

10/23/2003

Charles Frederick James Barnes

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EXAMINER

MERCEDES, DISMERY E

ART UNIT

PAPER NUMBER

2627

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/19/2006

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/690,569

Applicant(s)

BARNES, CHARLES FREDERICK
JAMES

Examiner

Dismery E. Mercedes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 55-84 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 55-67, 69-84 is/are rejected.
- 7) ☒ Claim(s) 68 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 and 12 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 55-57, 60-63, 67, 69, 72-75, 79, 82, 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parks et al. (US 5,739,975) in view of Ketchersid, III, hereinafter, Ketchersid (US 5,606,474).

As to Claim 55, Parks et al. discloses a storage medium; a head assembly having: a substantially planar surface; and a plurality of read/write heads; wherein the read/write heads are arranged substantially in the plane of said planar surface and wherein said information storage medium and said head assembly are arranged in mutually sliding abutment such that said read/write heads are substantially in sliding contact with the outer surface of the information storage medium in use (col.1, lines 48-55; col.17, lines 24-30; col.20, lines 29-40). Although Parks et al. discloses the relationship between thermal expansion and misalignment between the medium and the head (col.23, lines 55-65; col.24, lines 15-25), it fails to specifically disclose a substrate having a sufficiently low thermal expansion that in use thermal misregistration between the storage medium and the head assembly does not take place. However, Ketchersid discloses such (abstract; col.4, lines 6-16; col.8, lines 49-54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system as disclosed by Parks et al. by introducing low thermal expansion as disclosed by Ketchersid, the

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motivation being to provide with accurate positioning of the read/write heads over the tracks of high density disks (see col.4, lines 21-24 of Ketchersid, wherein he teaches that thermal expansion phenomenon leads to track misalignment/misregistration).

As to Claim 56, Parks et al. further discloses wherein said heads are provided on a monolithic layer (col.17, lines 51-55, as depicted in Fig.16d).

As to Claim 57, Parks et al. further wherein the heads are fixed in position and the information storage medium overlies the heads a lubricating layer provided therebetween (col.24, lines 66-67).

As to Claim 60, Parks et al. further discloses wherein all of the read/write heads are mounted on a single member (abstract; as depicted in Fig.1 & 5, col.9, lines 56-59).

As to Claim 61, Parks et al. further discloses wherein said member is generally sized and shaped to correspond to the size and shape of the information storage medium (as depicted in Figs 1-2).

As to Claim 62, Parks et al. further discloses wherein said information storage medium and said head assembly comprise similar substrates (see figs.16c-16f and fig.21, and col.17, lines 20-30, col.8, lines 5-10 and col.23, line 65-col.24, line 9. Note: this limitation is also disclosed by Ketchersid).

As to Claim 63 & 72, Parks et al. further discloses wherein said storage medium and read/write heads are resiliently biased together (col.17, lines 5-7; col.20, lines 10-40, wherein the heads and medium are maintained in close contact, reducing stiction between the head array and the medium, thus stabilizing and providing constant movement between the heads and medium).

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As to claim 67, Parks et al. further discloses wherein the head assembly comprises pre-processing and/or pre-amplification circuitry for pre-processing and/or pre-amplifying data read by said heads prior to being output from the head assembly (col.17, lines 31-40; col.21, lines 37-44; wherein the data read by heads is pre-amplified prior to output).

As to Claim 69, Parks et al. further discloses wherein at least one read/write head is provided for all of the tracks that are available for information storage on the storage medium (col.25, lines 4- 10).

As to Claim 73, Parks et al. further discloses wherein each bit of storage on said storage medium is associated with just one head (col.20, lines 51-59).

As to Claim 74, Parks et al. further discloses information transfer sub-assembly to transfer information to or from the read/write heads (col.1, lines 48-60; col.17, lines 31-34).

As to Claim 75, Parks et al. further discloses a tracking sub-assembly to adjust the positioning of the read/write heads of the drive so that each head is correctly aligned with its particular track on the storage medium (col.2, line 55 - col.3, line 5; col.31, lines 6-33).

As to Claim 79, Parks et al. further discloses an oscillation drive mechanism for oscillating the information storage medium with respect to the head assembly (col.7, lines 57-64; col.25, lines 35-62).

As to Claim 82, Parks et al. further discloses wherein the information storage medium and array of heads are arranged to oscillate linearly relative to one another (col.41, lines 49-63).

As to Claim 84, Parks et al. further discloses wherein a central portion of said information storage medium forms part of an induction motor (abstract).

3. Claims 58-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parks et al. in view Ketchersid III, further in view of Wang et al. (US 2001/0055702 A1).

As to Claim 58, Parks et al. and Ketchersid, discloses the information data storage apparatus as disclosed in claim 55, but fails to particularly disclose wherein said lubricating layer comprises a self- lubricating layer on at least one of the storage medium and head array. However, Wang et al. discloses a self-lubricating layer on surface of a data storage device (abstract). Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention to modify the apparatus as disclosed by Parks et al. and Ketchersid by implementing a self-lubricating layer on the storage medium, the motivation being to provide such apparatus with the enhanced capability of obtaining the desired lubrication and protection between the slider and the medium, and not evaporating under high temperatures (abstract, lines 9-14 taught by Wang et al.).

As to Claim 59, Wang et al. further discloses wherein said self-lubricating layer comprises an artificial diamond coating ([0006]).

4. Claims 64-65,83 are rejected as being unpatentable over Parks et al. in view Ketchersid., further in view of Nozieres et al. (EP 1,131,031 A1). As to Claim 64 & 83, Parks et al. discloses the apparatus as claimed in base claim 1 & 25, but fails to

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particularly disclose wherein the heads are arranged topologically in a rectangular array. However, Nozieres et al. discloses such (col.4, [0013], lines 36-39; col.10, [0028], lines 12-17, [0029], lines 41-45). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus as disclosed by Parks et al. and Ketchersid et al. by implementing a head array as disclosed by Nozieres et al., the motivation being to provide such apparatus with the enhanced capability of allowing the writing to adjacent tracks without the need for tilting the medium with respect to the head (col.4, lines 38-40 of Nozieres et al.).

As to Claim 65, Nozieres et al. further wherein said head array comprises connections to both ends of the rows and columns (col.4, [0013], lines 41-44).

5. Claim 66 is rejected as being unpatentable over Parks et al. in view Ketchersid, further in view of AAPA "Glass Substrate for Magnetic in HDD", Information Sheet [retrieved 7/24/2002] <http://www7.big.or.jp/~cgi19786/ngf/nglass/ng06e.html> (submitted by applicant), hereinafter, AAPA.

As to Claim 66, the combination of Parks et al. in view Ketchersid discloses the system as claimed in claim 55, and where a wafer being formed with connections to the heads (abstract), but fail to particularly disclose wherein said read/write heads are formed by deposition onto a glass ceramic wafer. However, AAPA discloses that glass substrates are well known in the art, and therefore it would have been obvious to one of ordinary skill in the art, at the time of the invention, to modify the apparatus disclosed by Parks et al, Ketchersid, by implementing a glass ceramic wafer, the motivation being because, it would provide such apparatus with the capability of obtaining higher storage

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capacity since the glass substrate has higher surface hardness, higher shock resistance and lower surface roughness (AAPA).

6. Claim 70-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parks et al. (US 5,739,975) in view Ketchersid, further in view of Liikanen et al. (US 6,678,102 B1).

As to Claim 70, the combination of Parks et al and Ketchersid discloses the information storage as claimed in claim 55, but failed to particularly disclose said information storage apparatus further comprises a refresh sub-assembly for ensuring that an optimal signal strength is maintained; (as per claim 71) wherein the refresh sub-assembly comprises a signal strength monitor for monitoring a signal strength available from the storage medium, said refresh sub-assembly means being arranged to rewrite the received signal if the signal strength available falls below a predetermined threshold. However, Liikanen et al. discloses a method and apparatus wherein the strength of a signal from the storage medium is monitored and if the signal strength is less than a predetermined threshold it outputs a write fault and then rewrites data (as depicted in Fig.4 and col.6, lines 3-47). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the apparatus as disclosed by Parks et al. and Ketchersid with the above teachings as disclosed by Liikanen et al., the motivation being to provide a method and apparatus to quickly and reliably sense a high fly write event in storage system without causing harmful effect to its performance (col.2, lines 45-54 of Liikanen et al.).

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7. Claims 76-78,80 are rejected as being unpatentable over Parks et al. in view Ketchersid, further in view of Dunfield et al. (US 3,335,850 B1).

As to Claim 76, the combination of Parks et al. and Ketchersid, discloses the apparatus as disclosed in 75, but fails to particularly disclose wherein one or more piezoelectric elements are arranged to adjust the position of all of said heads together. However, Dunfield et al. discloses such (as depicted in Figs 3A-3B, 6 and col.5, lines 11-15). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus as disclosed by Parks et al. and Ketchersid by implementing piezoelectric element as disclosed by Dunfield the motivation being because it is well known in the art, that piezoelectric element would provide such apparatus with actuation speed and more accuracy.

As to Claim 77, Dunfield et al. further discloses wherein one or more piezoelectric elements is/are arranged to adjust the position of all of said heads together (as depicted in Figs.3A-3B).

As to Claim 78, Dunfield et al. further discloses wherein said one or more piezoelectric elements is/are arranged to act on the structure or element on which the read/write heads are mounted to cause a degree of deformation of the supporting structure or element such that the heads mounted thereon undergo movement and can be adjusted in position (col.7, lines 20-35).

As to Claim 80, Parks et al. and Ketchersid, discloses the apparatus as claimed in claim 25, but fails to particularly disclose a piezo-electric actuator for driving said oscillation. However, Dunfield et al. discloses piezoelectric actuator to position the head relative the medium (as depicted in Figs 3A-3B, 6 and col.5, lines 11-15). Therefore it

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would have been obvious to one of ordinary skill in the art at the time of the invention to modify such apparatus by implementing piezoelectric element as disclosed by Dunfield the motivation being because it is well known in the art, that piezoelectric element would provide such apparatus with actuation speed and more accuracy.

8. Claim 81, is rejected as being unpatentable over Parks et al. in view Ketchersid, further in view of Germuska (GB 2178569 A). As to Claim 81, the combination of Parks et al. and Ketchersid, discloses the system as claimed in claim 79, but fails to particularly disclose two oscillating information storage media or head arrays arranged to oscillate in anti-phase. However, Germuska discloses two heads oscillating in anti-phase (abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus disclosed by Parks et al. and Ketchersid by replacing the heads of Germuska with the array of heads as disclosed by Parks et al., the motivation being because having the two head arrays oscillating in anti-phase may provide the apparatus with the enhanced capability of accessing all segments in all tracks (abstract of Germuska).

Allowable Subject Matter

9. Claim 68 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Note: Claim 68 is allowable over the prior art since the cited references failed to disclose: wherein said storage medium and/or said head assembly comprises a substrate of glass having a coefficient of expansion less than 1 nm per 100 mm per Kelvin temperature rise.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Guzik et al. (US 6,229,304)..

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dismery E. Mercedes whose telephone number is 571-272-7558. The examiner can normally be reached on Monday - Friday, from 9:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea Wellington can be reached on 571-272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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